Sheet: Arduino

+5V

SDA_IMU_5V

SCK_IMU_5V

File: Flamingo PCB – Arduinosch.sch

Sheet: Power

File: Flamingo PCB – Power.sch

Sheet: IMU

File: Flamingo PCB – IMU.sch

Sheet: Button Remote

File: Flamingo PCB – Button Remote.sch

Paul Blackburn

Sheet: /

File: Flamingo PCB.sch

Title: Flamingo PCB

Size: USLetter	Date: 2020–09–29	**Rev: 3**
KiCad E.D.A. kicad (5.1.7)–1		Id: 1/5

TODO:

SELECT CONNECTOR FOR BUTTON BOARD CABLE.
USE AS MANY POSITIONS AS THERE ARE FREE PINS,
SO THIS CAN BE AN EXTENSION HEADER

J?
Button Board Connector
5 V_OUT
4 Button_1
3 Button_2
2 Button_3
1 GND

TODO:
VOLTAGE DIVIDE SO THAT 4.2 V ENDS UP JUST BELOW 1.1 V
(internal voltage reference for ADC)

CHOOSE PIN

V_OUT
R?
–
0603
Volt_sens_divider
R?
–
0603
GND

If we use V_OUT, we can sense batt voltage up to 4.2 V,
and if USB is connected, we can use an additional
digital pin to sense that line.

TODO:
SELECT CONNECTOR
CHECK PINOUT

J?
APA102 HEADER
4
3 SCK_APA102CLOCK
2 MOSI_APA102DATA
1

V_OUT
C?
100uF
2312
TAJC107K010RNJ
GND

Heartbeat_LED
D?
Orange/Heartbeat
0603
LO L29K-H2K1-24-Z
R?
1.5k
0603
RC0603FR-071K5L
Vf = 1.8V, 2 mA typ
5V-1.8 = 3.2V
3.2V/1.5k = 2.1 mA
GND

Y201
Resonator
CSTNE16M0VH3C000R0
3.2x1.3x0.9mm
16 MHz
GND

U201
ATMEGA328P-AU
Button_1 1 PD3_(PCINT19/OC2B/INT1)
Button_2 2 PD4_(PCINT20/XCK/T0)
7 PB6_(PCINT6/XTAL1/TOSC1)
8 PB7_(PCINT7/XTAL2/TOSC2)
Button_3 9 PD5_(PCINT21/OC0B/T1)
10 PD6_(PCINT22/OC0A/AIN0)
11 PD7_(PCINT23/AIN1)
12 PB0_(PCINT0/CLKO/ICP1)
13 PB1_(PCINT1/OC1A)
14 PB2_(PCINT2/OC1B/SS)
MOSI_APA102DATA 15 PB3_(PCINT3/OC2A/MOSI)
MISO 16 PB4_(PCINT4/MISO)
SCK_APA102CLOCK 17 PB5_(PCINT5/SCK)
Heartbeat_LED 23 PC0_(PCINT8/ADC0)
V_BUS 24 PC1_(PCINT9/ADC1)
25 PC2_(PCINT10/ADC2)
26 PC3_(PCINT11/ADC3)
SDA_IMU_5V 27 PC4_(PCINT12/SDA/ADC4)
SCL_IMU_5V 28 PC5_(PCINT13/SCL/ADC5)
29 PC6_(PCINT14/RESET)
30 PD0_(PCINT16/RXD)
31 PD1_(PCINT17/TXD)
IMU_INTERRUPT_5V 32 PD2_(PCINT18/INT0)
19 ADC6
20 AREF
Volt_sens_divider 22 ADC7
4 VCC
6 VCC
18 AVCC
3 GND
5 GND
21 GND
+5V
GND

J202
ICSP_Header
MFR P/N
1 MISO
3 SCK
5 RST
2 VTG
4 MOSI
6 GND
V_BUS
GND

C207
0.1uF
Voltage
XXXX
MFR P/N
+5V
R201
10k
0603
RC0603FR-0710KL

FTDI_Header
RST 6
TXD_LOCAL 5
RXD_LOCAL 4
V_BUS 3
GND 2
GND 1
J201
GND

Sensing USB power or not: V_BUS will be pulled to GND through 100k when there is nothing on USB.
Use digital read to determine.

C208
0.1uF
XXXX
Voltage
MFR P/N
GND

Place next to VCC pins
+5V
C? 0.1uF 0603 06035C104KAZ2A
C? 0.1uF 0603 06035C104KAZ2A
C? 0.1uF 0603 06035C104KAZ2A
C? 0.1uF 0603 06035C104KAZ2A
GND

+5V
Place next to VCC pins
C? 10uF 0805 GRM21BR61C106KE15L
GND

Sheet: /Arduino/
File: Flamingo PCB – Arduinosch.sch

Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. kicad (5.1.7)-1 | Id: 2/5

Sheet: /IMU/
File: Flamingo PCB – IMU.sch

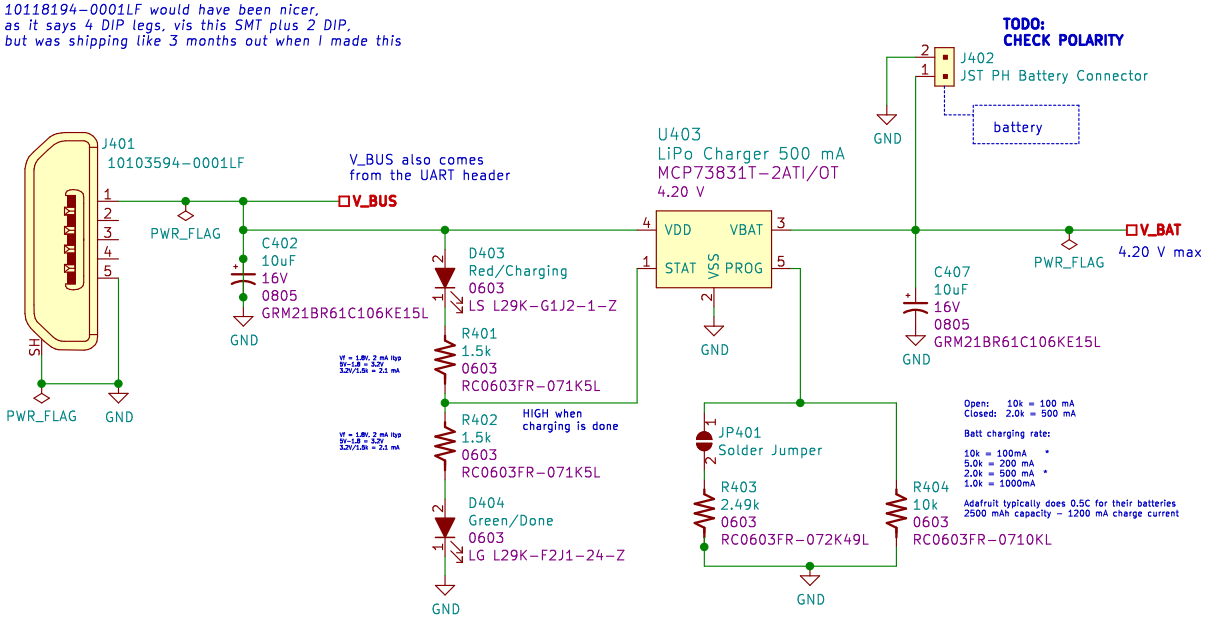
Title:

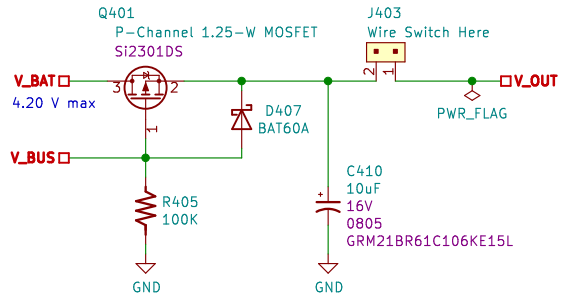
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.7)-1		Id: 3/5

10118194-0001LF would have been nicer,
as it says 4 DIP legs, vis this SMT plus 2 DIP,
but was shipping like 3 months out when I made this

TODO:
CHECK POLARITY

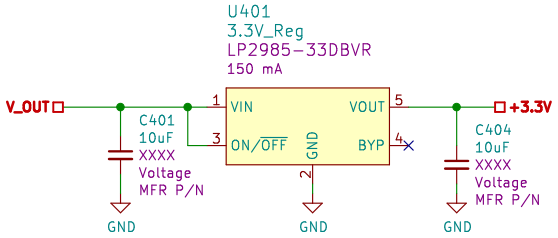
TODO:
NEED TO FIND A GOOD SOCKET FOR THE SWITCH CABLE
MIGHT JUST NOT POPULATE AND SOLDER DIRECT

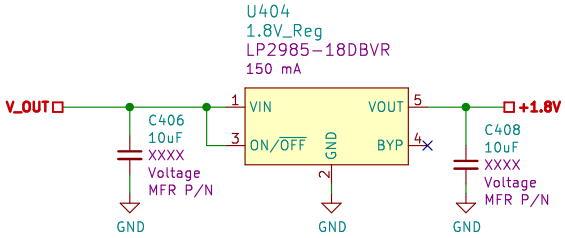




1) Charge battery while running: V_BUS at 5V, battery connected, switch on.
2) Charge battery while not running: V_BUS at 5V, battery connected, switch off.
3) Run on USB only: V_BUS at 5V, battery not connected, switch on.
4) No long-term discharge allowed when batt present but off and not connected to USB.

What is leakage of V_BAT through mosfet and 100k resistor?

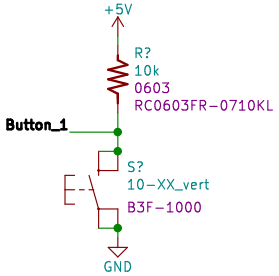


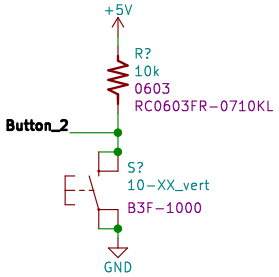


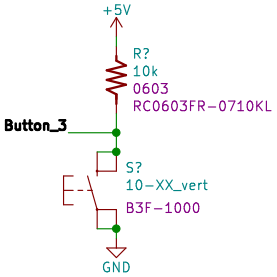
Datasheet suggests a Schottky to avoid reverse biasing Vin/Vout if that is a possibility but I don't expect that to happen.

Sheet: /Power/		
File: Flamingo PCB - Power.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.7)-1		Id: 4/5

This might have to be its own project







Sheet: /Button Remote/
File: Flamingo PCB - Button Remote.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.7)-1		Id: 5/5